AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows:

1. Please replace the first paragraph on page 1 with the following amended paragraph:

The present invention provides a process and an array for assaying for binding of target molecules to capture molecules on microarray devices, wherein the ~~mircoarray~~ microarray devices contain electrodes. Specifically, the present invention provides a binding (including nucleotide hybridization) process to detect binding on a microarray wherein the microarray contains electronically addressable electrode devices. The inventive detection process further provides for an enzymatically catalyzed oxidation/reduction reaction to take place within a "virtual flask" region of a microarray wherein the reaction is detected by current changes detected on the addressable electrode.

2. Please replace the first full paragraph on page 4 with the following amended paragraph:

The present invention further provides a ~~mircoarray~~ microarray device for detecting binding of a target molecule to a capture probe, comprising:

(a) an array having a plurality of electrodes and a plurality of capture molecules at sites corresponding to the electrodes;

(b) an oxidation/reduction enzymatic moiety bound to one or a plurality of target molecules in a sample for analysis, wherein the oxidation/reduction enzymatic moiety bound to the target molecules is incubated with the capture molecules on the array such that binding between capture molecules and target molecules that bind, will occur;

(c) a substrate molecule that will create a local voltage signal when catalyzed by the oxidation/reduction enzyme through local generation of electrochemical reagents; and

(e) a voltage signal measuring device electrically connected to each electrode on the array.

3. Please replace the first and second full paragraphs on page 5 with the following amended paragraphs:

Figure 1 shows the chemical reaction scheme when using horseradish peroxidase (HRP) as the oxidation/reduction enzyme. Specifically, the targeted molecule is AGP (α-1 acid glycoprotein) that has been complexed with HRP by adding a biotin-labeled antibody specific for an epitope of AGP. The target molecule is complexed with HRP by adding a avidin-labeled HRP enzyme. The ~~mircoarray~~ microarray site used for detecting AGP as the target molecule has another antibody binding to a different epitope on AGP as the capture molecule. Moreover, the first antibody (labeled "Ab1") is self assembled to an oligonucleotide microarray ~~mircoarray~~ through a tag array capture probe.

Figure 2 shows a similar configuration for detecting AGP as a known site on a microarray~~mircoarray~~, except this complex uses the multimeric nature of streptavidin to capture both biotin-labeled second antibody bound to a second epitope on AGP and biotin-labeled different oxidation/reduction enzyme laccase.

4. Please replace the last full paragraph on page 6 with the following amended paragraph:

Figure 10 shows a plot of a voltage versus current display for HRP (horse radish peroxidase) as a redox curve monitored by a single 100 micron diameter electrode on a bare (*i.e.*, no *in situ* synthesis of biomolecules) microarray~~mircoarray~~ chip. The cyclic voltmogram-like results indicate at a negative potential and the amperometric difference (with and without enzyme) was substantial.

5. Please replace the fourth paragraph on page 7 with the following amended paragraph:

Figure 14 shows a 3D plot for oligonucleotide hybridization electrochemical detection. Specifically, rabbit and Kras oligonucleotide sequences were *in situ* synthesized on an electrode containing microarray~~mircoarray~~ device. The chip was set up in an alternating electrode-counter electrode format having a checkerboard pattern of sites having a Kras (or rabbit) oligonucleotide capture probe sequence surrounded diagonally by counter electrodes without oligonucleotides

synthesized thereon. Target Kras sample (Operon) was treated to form single-stranded DNA (Operon) and biotinylated with Kras complement (Operon) according to manufacturers instructions. Streptavidin conjugated with HRP (Sigma) was added to the biotinylated Kras sequence complement to form a target complex or complementary Kras affinity-bound to HRP. The target Kras sample complexed with HRP was added to the chip and each electrode was measured for current (amps). These data are shown in Figure 14 in the top panel in a 3D plat and in the bottom panel showing a positive signal in a checkerboard for Kras oligonucleotide capture probes and the bottom panel showing no signal for rabbit sequence captures probes.

6. Please replace the second full paragraph on page 12 with the following amended paragraph:

Figure 14 shows a 3D plot for oligonucleotide hybridization electrochemical detection. Specifically, rabbit and Kras oligonucleotide sequences were *in situ* synthesized on an electrode containing ~~mircoarray~~ microarray device. The Kras sequence used was TACGCCTCCA GCTCC [SEQ IN NO 1]. The rabbit sequence used was AGGCTACGAA GACTT [SEQ ID NO 2]. Therefore, the oligonucleotide capture molecules synthesized by in situ electrochemistry techniques has a sequence of GGAGCTGGTG GCGTA [SEQ ID NO 3] for Kras known locations and a sequence of AAGTCTTCGT CGTAGCCT [SEQ ID NO 4] for rabbit known locations.